Conclusion: The results of this study confirmed the bone morphology and ACL characters of our patients, and found the tibial insertion size and intercondylar notch width is less than other published in the West, besides the length and inclination angle of ACL. Our date also suggest that MRI preoperative measurement can be confidently used in operative planning and our patients could just perform SB ACL-R, and the intercondylar notch width has the correlation with the weight and height.
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B0589

Short-term clinical outcome of atellocollagen-associated autologous chondrocyte implantation for the repair of chondral defects

T. Kaibara [1], K. Yabuuchi [1], E. Kondo [2], T. Onodera [1], T. Kameda [1], N. Iwasaki [1], K. Yasuda [3]
[1]*Department of Orthopaedic Surgery, Hokkaido University Graduate School of Medicine, Japan*
[2]*Department of Advanced Therapeutic Research for Sports Medicine, Hokkaido University School of Medicine, Japan*
[3]*Department of Sports Medicine and Joint Surgery, Hokkaido University Graduate School of Medicine, Japan*

Introduction: A number of treatment procedures have been developed for chondral defects in the knee joint. The authors previously reported the prospective multicenter clinical trial of atellocollagen-associated autologous chondrocyte implantation (ACI) for the repair of full-thickness chondral defects of the knees. In this procedure, the clinical scores based on Lysholm scale and knee-function scale improved significantly. Therefore, this atellocollagen-associated ACI (JACC: Japan Tissue Engineering, Gamagori, Japan) is approved by the Japanese Health Insurance since 2013. The purpose of this study was to evaluate short-term clinical outcome and complication in patients undergoing atellocollagen-associated ACI for the repair of chondral defects of the knees.
Methods: Between 2014 and 2015, we prospectively evaluated the clinical outcome and magnetic resonance imaging (MRI) of transplanting autologous chondrocytes cultured in atelocollagen gel for the treatment of full-thickness defects of cartilage in five cases (five knees) with cartilage lesions on a femoral condyle. There were 5 men with a mean age of 40 years (range: 30-47). The patients were included in this study if (1) they had at least one knee full-thickness chondral lesion caused by trauma, or osteochondritis dissecans; (2) the chondral lesion had not been improved or was not expected to be improved by conventional treatments including arthroscopy, débridement, marrow stimulation technique, or autologous osteochondral transplantation; (3) the area of their chondral defect was $\geq$4 cm^2. The causes of the osteochondral defect ware trauma (four knees) and osteochondritis dissecans (one knee). Concerning previous surgical procedures, osteochondral autologous implantation in one knee with osteochondritis dissecans. The lesions were on the medial femoral condyle in three knees and lateral femoral condyle in two knees. All cases underwent atellocollagen-associated ACI combined with; reconstruction of anterior cruciate ligament (ACL) in two knees, iliac bone graft in one knee, osteochondral autologous transplantation in one knee, reconstruction of lateral meniscus using semitendinous tendon in one knee. In surgical procedure, the patients underwent a two-stage procedure that included cartilage harvest and subsequent implantation of autologous chondrocytes embedded in atelocollagen gel. The cartilage biopsy was sent to a single facility (Japan Tissue Engineering), where chondrocytes were isolated from the cartilage biopsy, the engineered cartilage was prepared, and the chondrocytes were cultured to expand the cell population. The tissue-engineered cartilage was implanted 28 days. A medial or lateral parapatellar arthrotomy was carried out under tourniquet control. The chondral lesion was débrided as far as normal surrounding cartilage and until subchondral bone was visible. The defect was covered by a sutured periosteal flap after harvest of the cartilage. The flap was shaped and sutured to the surrounding rim of normal cartilage. After suturing half of the border of the flap, the chondrocyte–atelocollagen gel was placed in the defect, and the remaining border of the flap was sutured. Two weeks after transplantation, continuous passive movement of the joint was begun. Partial weight bearing was introduced 3 weeks after surgery and was gradually increased to full weight bearing with muscle training during the first 6 weeks after surgery. We performed clinical and MRI examinations on these patients at before surgery and the latest follow-up periods after surgery (mean 8.8 months, range: 3-13 months). We also performed arthroscopic biopsy in two knees.
Results: The mean size of chondral defect was 4.2 cm^2 (range: 4-6 cm^2). The Lysholm score significantly improved from 73.5 points to 85.5 points. Regarding the Knee injury and Osteoarthritis Outcome Score (KOOS), the total score significantly increased from 65 points to 81 points. In one case, the graft was detached at 8 months after the implantation, and arthroscopic debridement was required. MRI evaluation demonstrated complete defect coverage in 4 cases. Defect filling was defined as complete in 4 cases, and the remaining 1 case had near-complete defect filling. 4 cases had an intact interface of the repair tissue and the adjacent femoral cartilage. A biopsy was performed at the site of chondral implantation in two case, and we confirmed cartilage-like tissue with a proteoglycan-rich matrix pathologically.
Discussion: This study demonstrated there was excellent short-term outcome of atellocollagen-associated ACI. However, the treatment failures were subsequently treated with graft removal in one patient, who had a marked hypertrophic response at the grafted site and then detachment of approximately half of the graft. This case had been performed osteochondral autologous implantation before atellocollagen-associated ACI, so the reason of detachment was thought to be osteosclerosis of the subchondral bone for implantation. We need additional follow-up of the cases in the present study.
Conclusion: The findings of the present study suggest that transplanting chondrocytes in a newly formed matrix of atelocollagen gel promotes restoration of the articular cartilage of the knee. There were few transplant failures, except for detachment of the graft in one case.
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Subchondral drilling with/without collagen augmentation in patients undergoing high tibial osteotomy

M.S. Kim, I.J. Koh, Y.J. Choi, Y. In
Department of Orthopaedic Surgery, Seoul St. Mary's Hospital, College of Medicine, The Catholic University of Korea, South Korea

Purpose: The quality of cartilage regeneration after marrow stimulation is well documented to be unpredictable, because they do not regenerate consistent amount of cartilage. To overcome the shortcomings of the subchondral drilling technique, various augmentation techniques using synthetic collagen matrix, scaffolds or plug devices have been developed. However, their efficacy remains unclear. The purpose of this prospective randomized controlled study is to evaluate whether the subchondral drilling in combination with collagen gel augmentation could improve the quality of cartilage regeneration in patients undergoing medial open wedge high tibial osteotomy (HTO) for the treatment of medial unicompartmental knee osteoarthritis (OA).
Methods: We randomized twenty-four patients undergoing HTO in combination with subchondral drilling to receive either subchondral drilling alone (control group, n = 12) or subchondral drilling with collagen augmentation (experimental group, n=12). At postoperative one year, the clinical outcome in terms of Visual Analogue Scale of pain level (VAS), Knee Injury and Osteoarthritis Outcome Score (KOOS), International Knee Documentation Committee (IKDC) score, and Tegner scores were evaluated. In addition, second look arthroscopic examination and biopsy of regenerated cartilage were carried out when the HTO plate was removed. Biopsy specimens were graded by International Cartilage Repair Society Visual Assessment Scale (ICRS II scores). Finally, radiologic outcome in terms of Magnetic Resonance Observation of Cartilage Repair Tissue (MOCART) scores was assessed using follow up MRI undertaken.
Results: The clinical outcomes in terms of pain VAS, KOOS, IKDC and Tegner scores were significantly improved in both groups without between-group differences ($p > 0.1$ in all comparisons). However, total ICRS II scores in the experimental group was higher than the control group (1079 and 892, respectively) ($p = 0.005$). Radiographic outcome basing on MOCART scores in the experimental group were higher than the control group on postoperative one year follow-up MRI (69 and 46, respectively) ($p = 0.001$).
Discussion and Conclusion: The quality of chondrogenesis following subchondral drilling with collagen augmentation was superior to that of subchondral drilling only in patients undergoing HTO.
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B0594

Comparison of shoulder range of motion between nonsurgical and surgical treatments for shoulder stiffness

A. Hasegawa [1,2], T. Mihata [1,2], Y. Itami [1,2], M. Neo [1]
[1]*Department of Orthopedic Surgery, Osaka Medical College, Takatsuki, Osaka, Japan*
[2]*Department of Orthopedic Surgery, Daiichi Towakai Hospital, Takatsuki, Osaka, Japan*

Background: Shoulder stiffness is common in the working population. Therapy can be conservative (including anti-inflammatory drugs and physical therapy) or surgical. Arthroscopic capsular release has been reported to allow controlled and complete release of the contracted capsule and to provide more immediate improvement than conservative therapy; however, treatment of shoulder stiffness remains controversial. The purpose of this study was to compare the change in shoulder range of motion (ROM) between nonsurgical treatment and arthroscopic capsular release for shoulder stiffness.
Materials and Methods: We retrospectively reviewed our database and included patients with shoulder stiffness treated between 2013 and 2015. The inclusion criteria for this study were (1) a painful shoulder stiffness for at least one month; (2) restriction of passive external rotation of at least 50% compared with the unaffected shoulder; (3) restriction of passive forward flexion of less than 120°; (4) pain at night causing a sleep disturbance and inability to lie on the affected side; and (5) completion of more than 5 months of follow-up. The exclusion criteria were (1) evidence of glenohumeral joint arthritis; (2) evidence of full-thickness rotator cuff tear; (3) any fracture involving the shoulder girdle; and (4) previous surgery to the involved shoulder. Our final study group included 34 patients with shoulder stiffness (17 males and 17 females. mean 62.8 years). Sixteen shoulders in 16 patients (8 males and 8 females, mean 62.3 years) were treated nonsurgically (group N), and 18 shoulders in 18 patients (9 males and 9 females, mean 62.8 years) underwent arthroscopic capsular release (group A). For group N, a physical therapy intervention was started after the medical examination. For group A, 360° arthroscopic capsular release was performed under the general anesthesia following interscalene regional block. The day after the surgery, a physical therapy program was started. Average follow-up duration of group N was 8.0 months and that of group A was 8.3 months. Passive shoulder ROM was measured before initial treatment, at 1, 3, and 5 months after treatment, and at final follow-up. Maximum internal rotation was recorded as the highest vertebral body that the patient was able to reach with the thumb of the affected